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(54) **TOOL HOLDER**

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E21C 35/18	(2006.01)

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(58) **Field of Classification Search**
CPC E21C 35/19; E21C 35/197
USPC 299/106, 107, 110
See application file for complete search history.

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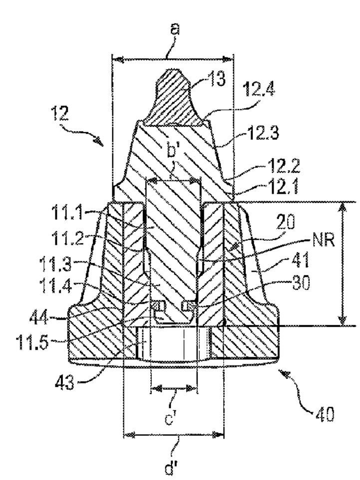
(57) **ABSTRACT**

The invention relates to a bit holder for a road milling machine or the like, having a base part on which a bit shank and a projection are shaped, the projection comprising a bit receptacle, and the bit receptacle being constituted from a socket-shaped insert made of hard material. With a bit holder of this kind, good rotational behavior of the bit can be assisted and stable bracing thereof can be guaranteed, with little parts outlay, if provision is made that the bit receptacle is embodied as a stepped bore that comprises a first and a second diameter region, the first diameter region having a larger inside diameter than the second diameter region.

8 Claims, 7 Drawing Sheets



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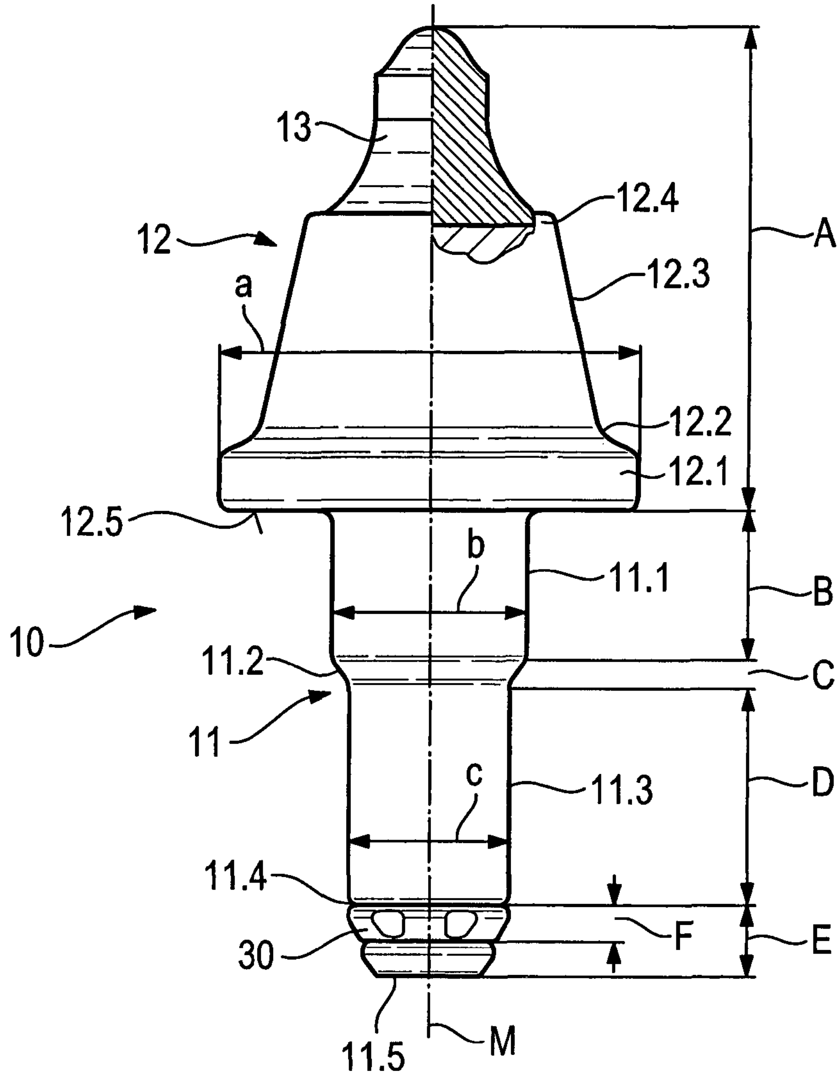
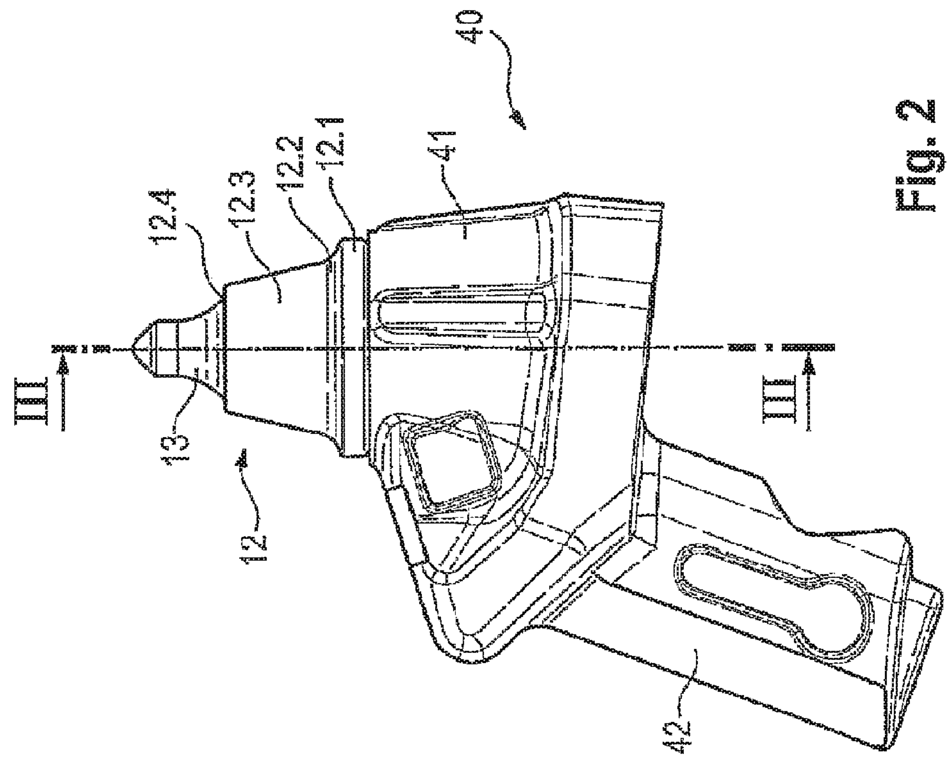
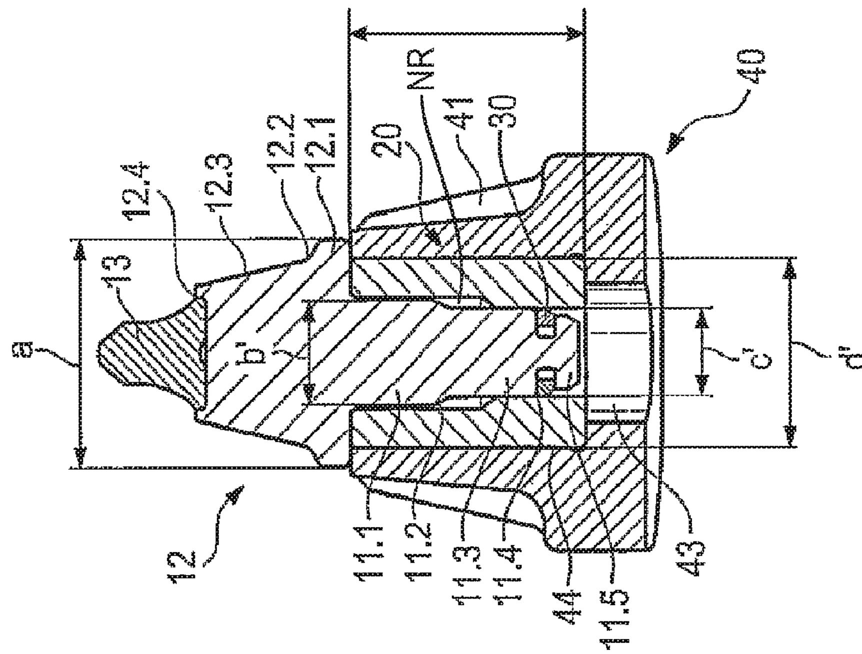

13
12.4
12
A
12.3
a
12.2
12.1
12.5
b
11.1
B
10
11.2
C
11
D
c
11.3
11.4
F
E
30
11.5
M

Fig. 1



40
41
42
12
12.1
12.2
12.3
12.4
13
III
III

Fig. 2



a
b'
c'
d'
NR
12
12.1
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12.3
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13
20
30
40
41
43
44
11.1
11.2
11.3
11.4
11.5

Fig. 3

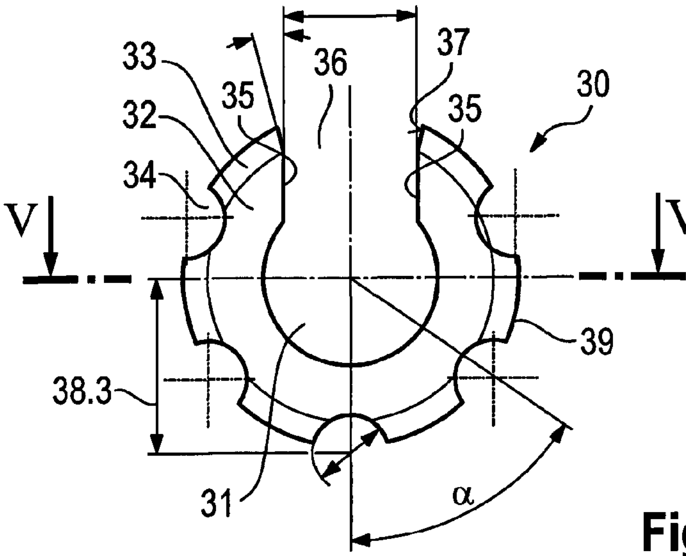


Fig. 4

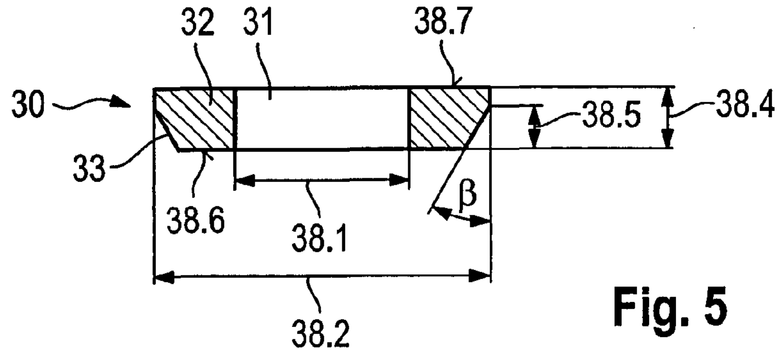


Fig. 5

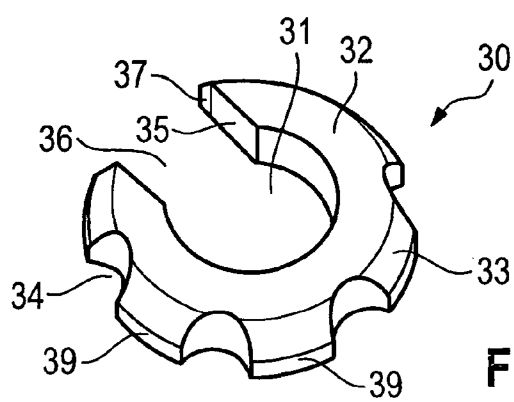


Fig. 6

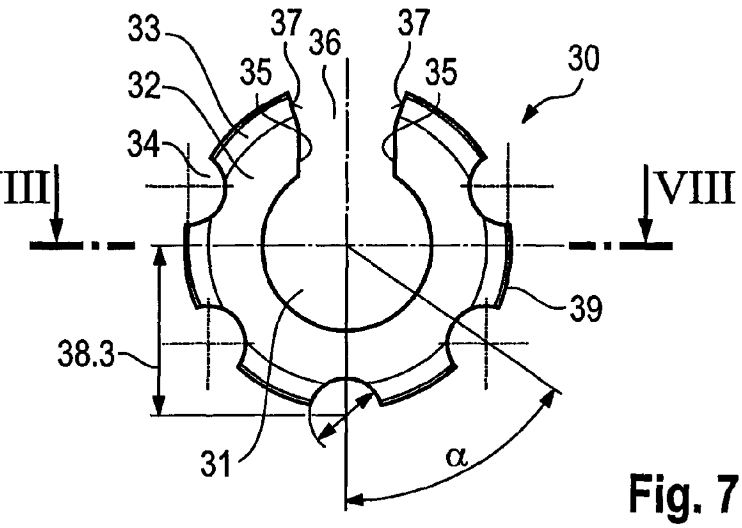


Fig. 7

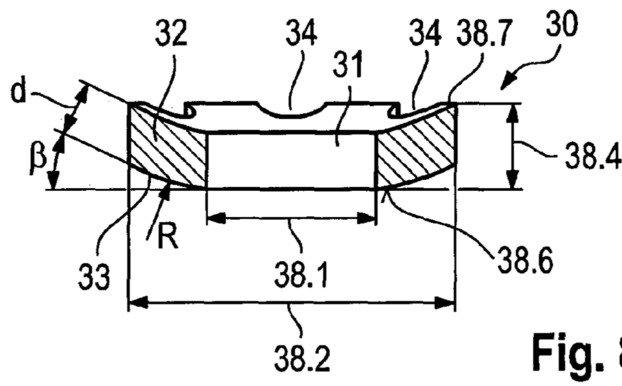


Fig. 8

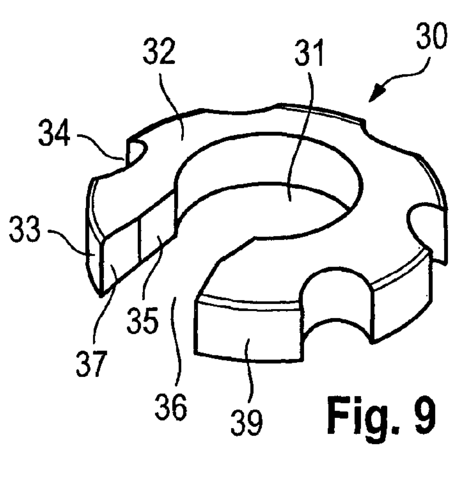


Fig. 9

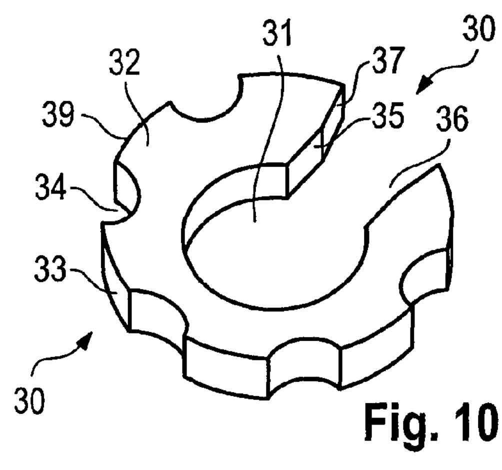


Fig. 10

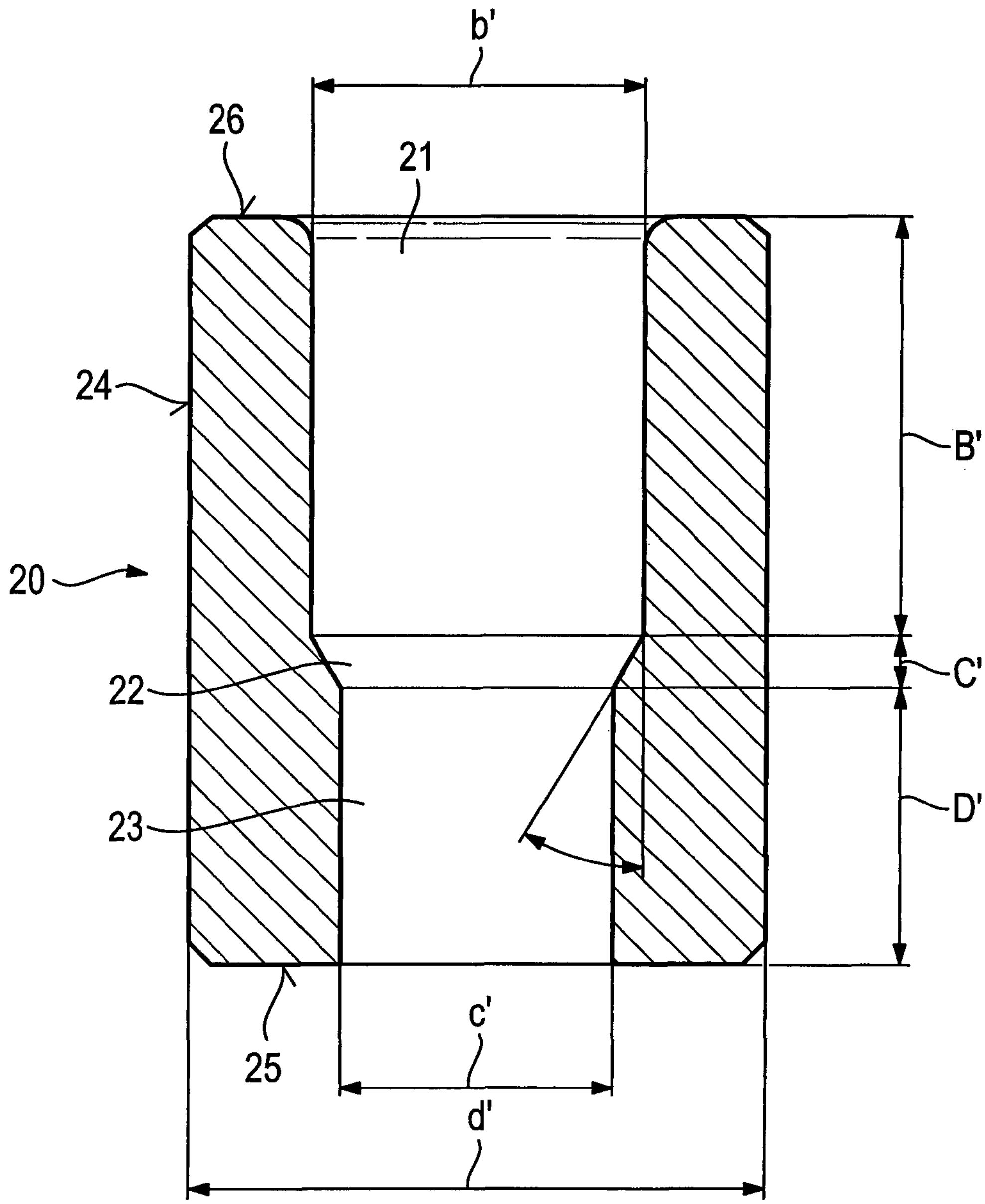


Fig. 11

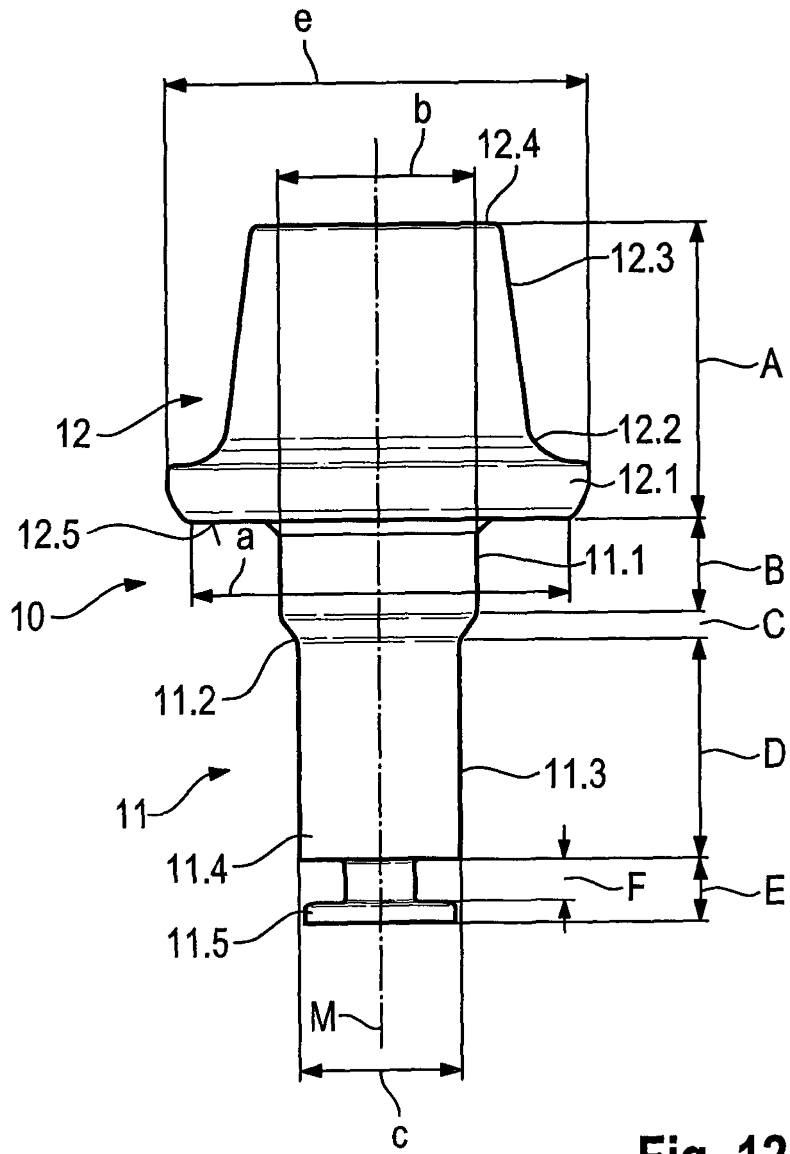
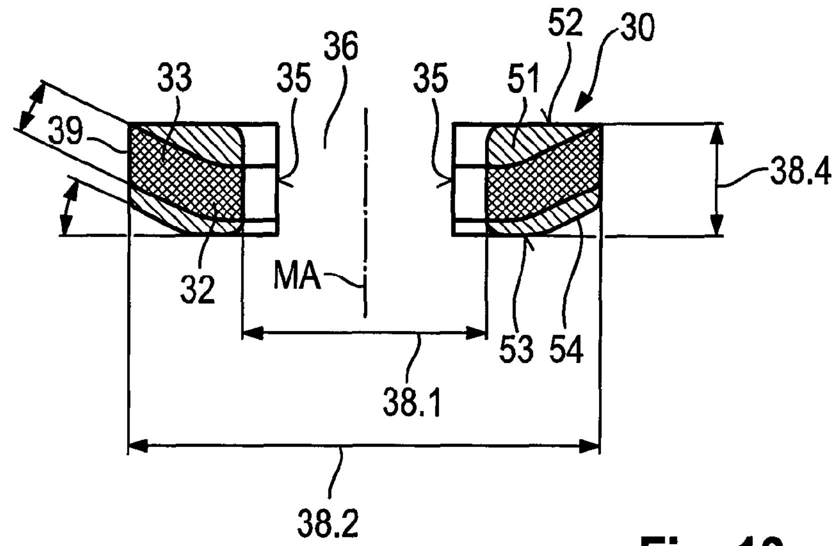


Fig. 12



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38.4
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MA
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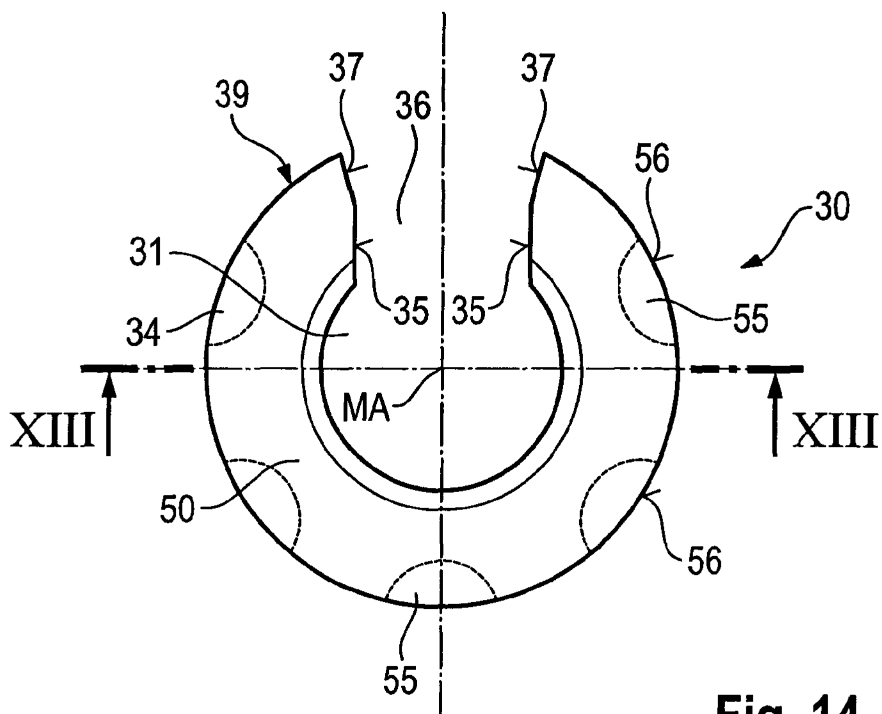
38.1
38.2

Fig. 13



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XIII
50
56
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Fig. 14

TOOL HOLDER

The invention relates to a bit holder for a road milling machine or the like, having a base part on which a bit shank and a projection are shaped, the projection comprising a bit receptacle, and the bit receptacle being constituted from a socket-shaped insert made of hard material.

A bit holder of this kind is known from DE 196 30 642 A1. A through bore that comprises a diameter-widening bore segment is incorporated into the bit holder. A socket-shaped insert made of hard metal is inserted into this bore segment. This insert forms a bit receptacle into which a round-shank bit can be inserted. The round-shank bit comprises a bit head and a bit shaft adjacent thereto. The bit shank carries a clamping sleeve that clamps with its outer periphery in the bit receptacle of the insert. The bit head is braced with respect to the insert via a wear protection disk. The clamping sleeve forms a rotary bearing system that retains the round-shank bit in an axial direction, but the latter remains freely rotatable around its longitudinal center axis. The round-shank bit rotates during operational use, and its bit head abrades along on the wear protection disk. Rotating wear is thereby produced. The wear protection disks are usually designed in such a way that they guarantee secure bracing of the bit head over the entire service life of the bit.

It is an object of the invention to create a bit holder for a road milling machine of the kind mentioned initially that, with little parts outlay, assists good rotational behavior of the bit and guarantees stable bracing thereof.

This object is achieved in that the bit receptacle is embodied as a stepped bore that comprises a first and a second diameter region, the first diameter region having a larger inside diameter than the second diameter region.

The two diameter regions form bearing segments that can be used to brace the shank bit. The first diameter region can directly receive a segment of the shank bit and can form a rotary bearing system therewith even without interposition of a wear protection sleeve. Parts outlay is thereby appreciably minimized. The second diameter region can likewise be used to brace the bit; it receives a second shank segment of the bit which then carries a simple securing element that is braced within the second diameter region. The result is to form a support length between the first and the second diameter region that guarantees tilt-stable bracing of the shank bit with little parts outlay. In addition, the diameter reduction also makes possible dimensionally optimized design of both the insert and the shank bit, contributing to a decrease in parts outlay. The stepped bore cross section moreover appreciably simplifies bit installation, even under austere construction site conditions and with restricted space.

According to a preferred configuration of the invention, provision can be made that the first diameter region forms an insertion opening for the bit to be installed. The first diameter region can transition into the insertion opening directly or via a taper segment, for example a conical introduction chamfer.

Particularly preferably, provision can be made that the first and the second diameter region lead into one another by means of a rounded or conical taper. On the one hand, this creates a stress-optimized transition. On the other hand, this taper offers the possibility of allowing a securing element to be slid on, and compressing it radially inward in order to impart to it a clamping effect that can be then be used to retain the shank bit. Bit installation can thereby be further simplified.

Especially for the sector of road milling applications, it has been found that a bit holder configuration in which the inside diameter of the first diameter region is selected to be between 16 mm and 24 mm is advantageous. This diameter range is dimensioned sufficiently for the prevailing loads, and in particular it can reliably receive, with no risk of material deformations, the transverse forces that act transversely to the longitudinal center axis of the shank bit and cause bearing stress.

For road applications of this kind it has also been found that the inside diameter of the second diameter region should be between 12 mm and 20 mm. Load-optimized discharge of the flexural forces in the bit shank is thereby ensured.

The diameter ratio between the diameter of the first diameter region and the diameter of the second diameter region is preferably selected in the range between 1.1 and 1.4, thereby taking into account excessive reductions in cross section and the accompanying risk of notch stress breakage.

According to a possible variant of the invention, provision can be made that the insert comprises an abutting surface, extending radially with respect to the longitudinal center axis of the insert, that proceeds annularly around the entrance opening of the first diameter region. The abutting surface can be used for direct abutment of the bit head of a shank bit, and interposition of a wear protection disk can also be omitted. The bit head then abrades directly on the insert during operational use. The desired faster wear of the shank bit with respect to the bit holder will then occur because the bit head is usually made of a softer material than the insert.

Particularly preferably, the insert comprises an abutment surface with which it is braced against a stop of the projection in such a way that the abutting surface transitions flush into an annular surface, adjacent to the abutting surface, of the projection. This annular surface can be arranged, in particular, radially with respect to the longitudinal center axis of the insert.

If provision is made that the bit receptacle is incorporated as a through bore into the insert and opens into a bore segment of the projection which forms a drive-out opening; and that the inside diameter of the second diameter region is smaller than the inside diameter of the bore segment, then on the one hand the insert of the shank bit can easily be removed through the drive-out opening and the through bore. On the other hand, in the event of damage the insert can also be removed through the drive-out opening.

The invention will be explained below in further detail with reference to an exemplifying embodiment depicted in the drawings, in which:

FIG. **1** is a side view and partial section of a shank bit;

FIG. **2** is a side view showing a combination made up of a bit holder and the shank bit shown in FIG. **1**;

FIG. **3** is a vertical section showing a detail of the depiction of FIG. **2**;

FIG. **4** is a plan view of a securing element;

FIG. **5** is a side view, and a section V-V according to FIG. **4**, showing the securing element according to FIG. **4**;

FIG. **6** is a perspective depiction of the securing element according to FIGS. **4** and **5**;

FIG. **7** is a plan view showing a further variant embodiment of a securing element;

FIG. **8** shows the securing element according to FIG. **7** along the section marked VIII-VIII in FIG. **7**;

FIGS. **9** and **10** are perspective views of the securing element according to FIGS. **7** and **8**;

FIG. **11** is a side view and vertical section showing an insert for installation in the bit holder according to FIGS. **2** and **3**;

FIG. **12** is a side view of an alternative variant embodiment of a shank bit;

FIG. **13** shows a securing element for the shank bit according to FIG. **12**, in a side view and in section along the section plane marked XIII-XIII in FIG. **14**; and

FIG. **14** is a plan view of the securing element according to FIG. **13**.

FIG. **2** shows a bit holder **40** that is utilized to receive shank bit **10** according to FIG. **1**. Bit holder **40** comprises a base part onto which a projection **41** and an insertion projection **42** are integrally shaped. As FIG. **3** shows, projection **41** is equipped with a cylindrical inner receptacle **44** into which an insert **20** made of hard material, in particular of hard metal, is inserted. Insert **20** is embodied in the form of a sleeve, and has a cylindrical outer geometry that is adapted to inside diameter d' of inner receptacle **44** in such a way that upon installation of insert **20** into bit holder **40**, a press fit results (interference fit). The inserting motion of insert **20** into inner receptacle **44** is limited by a setback. The setback is embodied in the transitional region of inner receptacle **44** to a drive-out opening **43** embodied as a bore. Inner receptacle **44** and drive-out opening **43** are coaxial with one another. Insert **20** has a stepped bore that comprises a first diameter region **21** and a second diameter region **23**. The two diameter regions **21**, **23** are guided into one another via a taper **22**. Taper **22** has a frustoconical geometry. As is evident from FIG. **3**, inside diameter c' of the second diameter region is selected to be smaller than the inside diameter of drive-out opening **43**. This results in a drive-out shoulder on insert **20**. Insert **20** can thus be ejected as necessary from bit holder **40** by means of a tool introduced through drive-out opening **43** and set against the drive-out shoulder.

The component extents of shank bit **10** in the direction of longitudinal center axis M of shank bit **10** are noted in FIG. **1**. Specifically, bit head **12**, including cutting element **13**, has a head length A that is in the range between 35 mm and 60 mm. First cylindrical segment **11.1** has an extent B in the direction of longitudinal center axis M of the bit shanks 30 mm. An extent of 15 mm is selected in the present case. The length of the transitional segment is labeled C, and should be <10 mm. An extent of approx. 3 mm is selected in the present case. The length of second cylindrical segment **11.3** is noted as D, and has an extent in the direction of longitudinal center axis M in the range between 10 and 40 mm. The length of terminal segment E, encompassing securing receptacle **11.4** and shoulder **11.5**, should be a minimum of 3 mm. A dimension of 7 mm is selected in the present case, the groove width F of securing receptacle **11.4** being approx. 3 mm.

Dimensions are further provided in FIG. **1** for outside diameter a of support surface **12.5**, diameter b of first cylindrical segment **11.1**, and diameter c of second cylindrical segment **11.3**. Diameter b of first cylindrical segments **11.1** is in the range between 18 mm and 30 mm. Diameter c of second cylindrical segment **11.3** is selected in the range between 14 mm and 25 mm. Outside diameter a of support surface **12.5** is in the present case between 30 mm and 46 mm, and is selected particularly preferably in the range between 40 mm and 44 mm.

FIG. **2** shows a bit holder **40** that is utilized to receive shank bit **10** according to FIG. **1**. Bit holder **40** comprises a base part onto which a projection **41** and an insertion projection **42** are integrally shaped. As FIG. **3** shows, projection **41** is equipped with a cylindrical inner receptacle **44** into which an insert **20** made of hard material, in particular of hard metal, is inserted. Insert **40** is embodied in the form of a sleeve, and has a cylindrical outer geometry that is adapted to inside diameter d' of inner receptacle **44** in such a way that upon installation of insert **20** into bit holder **40**, a press fit results (interference fit). The inserting motion of insert **20** into inner receptacle **44** is limited by a setback. The setback is embodied in the transitional region of inner receptacle **44** to a drive-out opening **43** embodied as a bore. Inner receptacle **44** and drive-out opening **43** are coaxial with one another. Insert **20** has a stepped bore that comprises a first diameter region **21** and a second diameter region **23**. The two diameter regions **21**, **23** are guided into one another via a taper **22**. Taper **22** has a frustoconical geometry. As is evident from FIG. **3**, inside diameter c' of the second diameter region is selected to be smaller than the inside diameter of drive-out opening **43**. This results in a drive-out shoulder on insert **20**. Insert **20** can thus be ejected as necessary from bit holder **40** by means of a tool introduced through drive-out opening **43** and set against the drive-out shoulder.

The configuration of insert **20** is detailed further in FIG. **11**. As this drawing shows, the external geometry of insert **20** is constituted by a fit surface **24** that, as described above, forms a snug fit with inner receptacle **44**. Transversely to the longitudinal center axis of insert **20**, insert **20** possesses a lower abutment surface **25** that, in the installed state, comes to a stop against a countersurface of inner receptacle **44**, as shown in FIG. **3**. An exact association of insert **20** with bit holder **40** is thereby enabled. Insert **20**, facing away from abutment surface **25**, abuts with an abutting surface **26** flush against an adjoining end face of bit holder **40**, as likewise illustrated in FIG. **3**. First diameter region **21** of insert **20** has a diameter b', and second diameter region **23** has a diameter c'. Diameters b' and c' are designed in a manner adapted to diameters b and c of the respective first and second cylindrical segments **11.1** and **11.3** of bit shank **22**. The association of shank bit **10** with insert **20** is ensured here, with little clearance, in such a way that shank bit **10** remains freely rotatable around its longitudinal central axis M. The extent of first diameter region **21** in the direction of longitudinal central axis M is B'; as FIG. **3** clearly indicates, this extent B' is greater than the extent b of first cylindrical segment **11.1**.

The extent of second diameter region **23** is labeled D' in FIG. **11**, and the extent of taper region is labeled C'. Extent D' is selected so that bit shank **11** is received entirely within insert **20**, as is apparent from FIG. **3**.

As mentioned earlier, a securing receptacle **11.4** in the form of a circumferential groove is provided in the region of bit shank **11**. A securing element **30** is received in this groove, as shown in further detail in FIGS. **4** to **6**. As these drawings show, securing element **30** possesses a partially annular circumferential clamping part **32**, radially externally adjacent to which are fastening segments **33**, which in the present case are embodied in the form of a chamfer as cross-sectional reductions. The cross-sectional reductions are interrupted by recesses **34** which extend into clamping part **32**. The result is to form prong-shaped radially external holding segments **39** in the form of curved regions spaced away from one another at an angle α preferably from 50° to 70°, in the present case 60°. These convex curved regions serve to clamp securing element **30** in place in second diameter region **23** of insert **20**, as shown in FIG. **3**. Clamping part **32** surrounds a bearing receptacle **31** that, together with the groove base of securing receptacle **11.4**, forms a rotary bearing system. This bearing receptacle **31** opens into a slot that forms an introduction opening **36**. Introduction opening **36** is demarcated by two rims **35** that open out into introduction chamfers **37**. Introduction chamfers **37** are arranged so that they widen into introduction opening **36**.

As is evident from FIG. **5**, bearing receptacle **31** has an inside diameter **38.1**, and fastening segments **33** define an outside diameter **38.2**. Securing element **30** has an overall height **38.4** that is less than the width of the groove-shaped securing receptacle **11.4**. Fastening segments **33** extend over a segment height **38.5**, and define an inclination angle β.

FIGS. **7** to **10** show a further variant configuration of a securing element **30**. In these Figures, identical reference characters refer to corresponding elements already described with reference to FIGS. **4** to **6**, and reference may be made to the previous statement in order to avoid repetition. Securing element **30** again comprises a bearing receptacle **31** that is radially accessible via an introduction opening **36**. Introduction opening **36** is demarcated by a rim **35**, and rim **35** leads into introduction chamfers **37**. In contrast to the embodiment according to FIGS. **4** to **6**, securing element **30** is produced in the form of a stamped and bent part in which no material-removing machining or similar reshaping work is necessary in order to constitute fastening segment **33** that is angled with respect to clamping part **32**. Correspondingly, for production of securing element **30**, firstly a disk-shaped cross section is stamped out, and that is then reshaped, in a bending step, into the configuration visible in FIG. **8**.

As is evident from FIG. **8**, outside diameter **38.2** of securing element **30** is arranged concentrically with the wall (inside diameter **38.1**) forming bearing receptacle **31**. To achieve this concentricity, either the outer contour of securing element **30** can be reworked, or the stamping die can already be configured so that concentricity is achieved after the concluding bending step.

It is further evident from FIG. **8** that thickness d of securing element **30** is selected to be approximately the same both in the region of clamping part **32** and in the region of fastening segment **33**. Fastening segment **33** forms on its underside a convex bulge having a radius R, thus resulting in a surface inclined with respect to the longitudinal center axis of securing element **30**, which surface facilitates installation of securing element **30** in insert **20** of bit holder **40**, as will be explained in further detail below.

Securing element **30** is concavely indented in the region of its upper side. This results in the formation of linear or narrow strip-shaped abutting regions **38.7** that serve for better rotational behavior of securing element **30** with respect to shank bit **10**, as will be explained in further detail below. Recesses **34** are once again recessed in partially circular fashion into fastening segment **33**, and extend into the region of clamping part **32**.

For installation of securing element **30** on shank bit **10**, the latter is firstly placed with introduction chamfers **37** on the groove base of securing receptacle **11.4**. Bit shank **11** can then be slid into bearing receptacle **31** by means of a radial pressure, the rotary bearing system then being formed between the groove base of securing receptacle **11.4** and bearing receptacle **31**. Securing element **30** expands radially upon insertion of bit shank **11**, and once bit shank **11** has passed rims **35**, securing element **30** snaps back into its original shape so that bit shank **11** latches into bearing receptacle **31**. A lossproof connection of securing element **30** to shank bit **10** is thereby achieved. The unit made up of shank bit **10** and securing element **30** can then be slid into insert **20** of bit holder **40**. For this, fastening segments **33** that face toward the free end of bit shank **11** are set onto taper **22**. Because of the inclined embodiment of fastening segments **33**, as shank bit **10** is slid in, securing element **30** becomes compressed radially inward and can thus be slid into second diameter region **23**. Securing element **30** is thereby clamped against the inner wall of second diameter region **23**. The deformation of securing element **30** is such that the free rotatability of bit shank **11** is maintained. Securing element **30** reliably braces with its holding segments **39** in second diameter region **23** in the region of fastening segments **33**. The insertion motion of shank bit **10** into insert **20** is limited by support surface **12.5** of bit head **12**. The latter comes to a stop against abutting surface **26** of insert **20**, as shown in FIG. **3**.

Shank bit **10** rotates in bearing receptacle **31** during operational use, and bit head **12** abrades with its support surface **12.5** against abutting surface **26** of insert **20**. Because insert **20** is made of a hard material and bit head **12** is produced from a material that is softer relative thereto, only a small amount of wear occurs on bit holder **40**. Shank bit **10**, in contrast, is relatively more severely worn away in the region of its support surface **12.5**. What results is a wear system in which the expensive bit holder **40** is worn away less than shank bit **10**. A plurality of shank bits **10** can thus be used on one bit holder **40** before the latter reaches its wear limit.

Two wear effects occur, as indicated above, when shank bit **10** abrades away in the region of its support surface **12.5**. On the one hand, the overall height of support segment **12.1** becomes reduced. On the other hand, abutting surface **26** of insert **20** is also worn away. As a result of these effects, bit shank **11** continuously recedes in the direction of its longitudinal center axis M into insert **20**. First cylindrical segment **11.1** correspondingly slides along first diameter region **21**, and securing element **30** along second diameter region **23**. Free rotatability of shank bit **10** around its longitudinal center axis M is guaranteed by the use of a resetting space NR. This resetting space NR is shown in FIG. **3**. It is created by the fact that the axial length of first cylindrical segment **11.1** is less than the axial longitudinal extent of first diameter region **21**. In order to allow bit holder **40** having insert **20** to be utilized in wear-optimized fashion over its maximum possible service life, the axial extent of resetting space NR should be selected in the range between 4 mm and 20 mm.

With the geometrical relationships indicated, it is thus possible to go to the lower limit range of 4 mm when the substrate to be worked is fairly soft. Greater lengths for resetting space NR are better suited for hard ground. In road construction, where mixed concrete and asphalt need to be worked, a length of the resetting space from 7 mm to 20 mm has proven suitable.

In order to ensure secure retention of shank bit **10** over the entire service life of bit holder **40** in the context of the above-described wear system, second diameter region **23** of insert **20** is also dimensioned, in terms of its axial extent, so that securing element **30** can slide in an axial direction against the inner wall of second diameter region **23** in order to compensate for the longitudinal wear of insert **20** and of bit head **12**. The axial length of the second diameter region must therefore be correspondingly adapted to the dimensions of resetting space NR. Applied to the dimensioning specifications above, second diameter region **23** must therefore have an axial length of at least 4 mm to 20 mm, plus twice a retention length for the securing element (position of securing element **30** in the unworn and worn state of bit holder **40**). The retention length should be a minimum of 2 mm.

As is evident from FIG. **3**, in the interest of a compact configuration the terminal shoulder **11.5** can be reset into the region of an opening segment that forms drive-out opening **43**. The axial length of the opening segment is to be dimensioned accordingly.

During operational use, bit shank **11** slides with its first cylindrical segment **11.1** against the associated inner surface of first diameter region **21**. Because, here as well, insert **20** is made of a hard material and bit shank **11** is made of a softer material, only a small amount of wear is caused here on insert **20** and thus on bit holder **40**.

Securing element **30** as shown in FIGS. **7** to **10** is braced with its abutting regions **38.6** and **38.7**, in linear or annular fashion with little radial extent, with respect to the groove walls of securing receptacle **11.4**, so that good rotation behavior is achieved.

Once shank bit **10** is worn out, it can be removed. For this, a drive-out force is introduced by means of a suitable drive-out tool into the free end of bit shank **11** in the region of shoulder **11.5**. Shank bit **10** with its securing element **30** then slides over second diameter region **23** until it springs back radially in the region of first diameter region **21**. Shank bit **10** can then be freely removed.

FIGS. **12** to **14** show an alternative variant configuration of the invention. The configuration of shank bit **10** corresponds in terms of its general conformation to shank bit **10** according to FIG. **1**. Shank bit **10** according to FIG. **12** can be installed, using securing ring **30** according to FIGS. **13** and **14**, in insert **20** of bit holder **40** according to FIGS. **2**, **3**, and **11**. In order to avoid repetition, those configuration features which differ will be discussed below; otherwise reference is made to the statements above.

Shank bit **10** having bit shank **11** and bit head **12** is once again produced as an extruded part or alternatively as a lathe-turned part.

Bit head **12** possesses support segment **12.1** having support surface **12.5**. Support segment **12.1** leads via a convex radius transition into support surface **12.5**. Support segment **12.1** possesses an outside diameter e in the range between 40 mm and 45 mm. Diameter a of support surface **12.5** is selected in the range between 36 mm and 42 mm. With these diameter relationships, i.e. more generally with a diameter ratio from 1 to 1.3 (diameter e/diameter a), considerable deformation is achieved in the region of support segment **12.1** upon cold extrusion. These material deformations result in a particularly tough composite material with good strength properties.

Bit head **12** once again comprises, adjacent to support segment **12.1**, a concave taper **12.2** that leads into the frustoconical discharge surface **12.3**. A cutting element receptacle **12.4** is formed at the end. A cutting element (**13**, see above) can be soldered into this.

Support surface **12.5** leads via a frustoconical transition segment into first cylindrical segment **11.1**. The extent of first cylindrical segment **11.1** in the direction of longitudinal center axis M is selected to be appreciably shorter than in the exemplifying embodiment according to FIG. **1**. Length B is 9 mm in the present case. This represents, with a diameter b of 19.8 mm, a sufficient dimension for road milling applications. With the shortened length of first cylindrical segment **11.1**, the axial length of resetting space NR becomes greater. In the present case what results for road milling applications with mixed surfaces (asphalt and concrete) is a particularly suitable wear length of approx. 15 mm to 18 mm for resetting space NR.

Second cylindrical segment **11.3** has an extent D in the direction of longitudinal center axis M of 21.6 mm, and thus holds securing receptacle **11.4** at a spacing from support surface **12.5** sufficient for road milling applications. Diameter c of second cylindrical segment **11.3** is 16.5 mm.

Securing receptacle **11.4** is embodied with a width F of 4.5 mm, consequently somewhat wider than in FIG. **1** and coordinated with securing element **30** according to FIGS. **13** and **14**.

The end-located shoulder **11.5** has a thickness of 3 mm and is thus sufficiently stable for road milling applications.

The conformation of securing element **30** will be discussed in further detail below with reference to FIGS. **13** and **14**.

Securing element **30** comprises the stamped and bent part shown in FIGS. **7** to **10** as a basic member, with the difference that recesses **34** are not cut in as far as clamping part **32**. Reference is made to the statements above regarding the features that are otherwise identical.

This base member is equipped on its surface with a layer **50** that has a lower hardness than the base member. In the present case layer **50** is made of a plastic material. In a particularly preferred application, layer **50** is made of a plastic material, from polyurethane or a composite material containing polyurethane. For reasons of production simplification and in order to create an intimate bond with the base member, layer **50** is molded onto the base member using the injection molding process.

Layer **50** comprises two coating regions **51** and **54**. Coating regions **51**, **54** are arranged respectively on the concavely curved upper and the convex undersides of the base member. In the region of recesses **34**, coating regions **51**, **54** are interconnected via connecting segment **55** in such a way that recesses **34** are completely filled up. The radially externally located curved regions of layer **50** thus transition flush into the convex curved regions of holding segments **39**. Layer **50** can also project radially beyond holding segments **39**.

Radially outer contact segments **56** are formed with the layer regions that fill up recesses **34**. These segments abut internally against second diameter region **23** of insert **20**. This produces here a friction surface pairing that introduces, in the direction of the longitudinal center axis, an additional frictional resistance that counteracts a pulling-out motion in that direction. The retention of shank bit **10** in insert **20** is thereby improved.

As is evident from FIG. **13**, the radially externally located regions of holding segments **39** remain exposed, so that their function as described above is maintained. In addition, introduction chamfers **37** and rims **35** remain uncoated, so that the guidance function upon installation in cutting element receptacle **12.4** is maintained. Inside diameter **38.1** is furthermore also exposed and forms, with the groove base of securing receptacle **11.4**, a wear-resistant and permanently accurately fitted rotary bearing system.

The two coating regions **51** and **54** respectively constitute bearing surfaces **52**, **53** that proceed in the form of a partial ring around the longitudinal center axis of securing element **30**. The two bearing surfaces **52**, **53** extend radially and are parallel to one another. They serve for abutment against the groove walls of securing receptacle **11.4**, in which context the axial clearance described above must be complied with. In order to achieve tilt-free operation, the axial clearance should be selected in the range between ≥0.2 mm and ≤4 mm. The two bearing surfaces **52**, **53** complete the accurately fitted rotary bearing system. Layer **50** increases the stiffness, in particular the torsional strength of the base member, so that this stiff composite member reliably retains shank bit **10**.

The invention claimed is:

1. A bit holder for a road milling machine or the like, comprising:

a base part including an insertion projection and a second projection, the second projection having an inner receptacle; and

an insert received in the inner receptacle, the insert being made of a harder material than the base part, the insert having a bit receptacle defined therein, the bit receptacle including a stepped bore having a first diameter region and a second diameter region, the first diameter region having a larger inside diameter than the second diameter region;

wherein the insert has a longitudinal center axis, and the insert includes an axially outer abutting surface extending radially with respect to the longitudinal center axis, the axially outer abutting surface extending annularly around an entrance opening of the first diameter region;

wherein the second projection includes an annular axially outer surface surrounding the inner receptacle of the second projection, and the second projection defines a stop at an axially inner end of the inner receptacle; and

wherein the insert includes an axially inner abutment surface received against the stop of the inner receptacle, such that the axially outer abutting surface of the insert is adjacent to and substantially flush with the annular axially outer surface of the second projection.

2. The bit holder of claim **1**, wherein:

the first diameter region defines an insertion opening for a bit to be installed.

3. The bit holder of claim **1**, wherein:

the first and second diameter regions lead into one another via a conical taper.

4. The bit holder of claim **1**, wherein:

the inside diameter of the first diameter region is in a range of from 16 mm to 24 mm.

5. The bit holder of claim **1**, wherein:

the inside diameter of the second diameter region is in a range of from 12 mm to 20 mm.

6. The bit holder of claim **1**, wherein:

a diameter ratio between the inside diameter of the first diameter region and the inside diameter of the second diameter region is in a range of from 1.1 to 1.4.

7. The bit holder of claim **1**, wherein:

the annular axially outer surface of the second projection extends radially with respect to the longitudinal center axis of the insert.

8. The bit holder of claim **1**, wherein:

the second projection includes a bore segment forming a drive-out opening, the bore segment having a bore segment inside diameter; and

the bit receptacle defines a through bore of the insert, the through bore opening into the bore segment of the second projection, the inside diameter of the second diameter region being smaller than the bore segment inside diameter.

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